

CLAIMS

1. A device for switching ATM cells establishing a single path per virtual circuit, having N.R inputs and N.R outputs, N and R being two integers not less than two, the device comprising at least two stages, including an inlet stage (21; 31; 41₁, ..., 41_R) having R.N sets of Q outputs (213₁₁; 313₁₁; 413₁₁) and an outlet stage (22; 33; 421₁, ..., 422_R, ...) having R.N sets of Q' inputs (223₁; 333₁; 442₁),

characterized in that for the flow of data carried by any intermediate link (213_i, 222_j; 313_i, 332_j, 413_i, 423_j) that is part of the single path set up between an input and an output to be a subset of the incoming flux at that input and also a subset of the outgoing flux at that output, each input (212₁; 312₁; 412₁) of the inlet stage can be connected to an output of the inlet stage which can be selected only from Q outputs (213₁₁, ..., 213_{R1}; 313₁, ..., 313_{1R}; 413₁₁, ..., 413_{1R}) exclusively associated with that input; and

in that each output (223₁; 331₁; 422₁) of the outlet stage can be connected to an input of the outlet stage which can be selected only from Q' inputs (222₁₁, ..., 222_{1R}; 332₁₁, ..., 332_{R1}; 423₁₁, ..., 423_{1R}) of the outlet stage exclusively associated with that output.

2. A switching device according to claim 1 including only one inlet stage (21) and one outlet stage (22) each including N switching matrices, characterized:

in that, Q being equal to N, each matrix (211₁) of the inlet stage has R inputs (212₁, ..., 212_R) and R.N outputs (213₁₁, ..., 213_R) organized into R sets of N outputs, each set corresponding to a respective one of the R inputs; in that each input (212₁) of that matrix can be connected to an output of that matrix which can be selected only from N outputs (213₁₁, ..., 213_{R1}) of the set of outputs corresponding to that input;

in that, Q' being equal to N, each matrix of the

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outlet stage has R outputs ($223_1, \dots, 223_R$) and $N.R$ inputs ($222_{11}, \dots, 222_{1R}$); and in that each output (223_1) of that matrix can be connected to an input of that matrix which can be selected only from $R.N$ inputs ($222_{11}, \dots, 222_{1R}$) of that matrix; and

in that each of the N outputs ($213_{11}, \dots, 213_{1N}$) of each set of outputs of the first stage is connected to an input ($222_{11}, \dots$) of a respective one of the N matrices of the outlet stage,

3. A switching device according to claim 1 including an inlet stage (31), a central stage (32), and an outlet stage (33); characterized:

- in that, Q being equal to R , the inlet stage (31) comprises N matrices ($311_1, \dots$) each having R inputs ($312_1, \dots$) and R^2 outputs ($313_{11}, \dots$), those outputs being organized into R sets of R outputs each corresponding to one of said R inputs, and in that each input (312_1) of that matrix can be connected to an output of that matrix which can be selected only from R outputs ($313_{11}, \dots, 313_{R1}$) of the set of outputs corresponding to that input;

- in that the central stage (32) comprises R sets of R matrices ($321_{11}, \dots$) each having N inputs and N outputs, the R outputs of each set of outputs of the inlet stage being connected to inputs belonging to the same set of R matrices of the central stage; and

- in that, Q' being equal to R , said outlet stage (33) comprises N matrices ($331_1, \dots$) each of those matrices having R^2 inputs ($332_1, \dots$) and R outputs ($333_1, \dots$), those R^2 inputs being organized into R sets of R inputs, each set respectively corresponding to one of those R outputs; and in that each output ($323_1, \dots$) of that matrix can be connected to an input of that matrix which can be selected only from R inputs ($322_{11}, \dots, 322_{R1}$) of the set of inputs corresponding to that output; and in that the R inputs ($322_{11}, \dots, 322_{R1}$) of each set are respectively connected to R outputs respectively belonging to the R

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sets of matrices of the central stage (32).

4. A switching device according to claim 1 including an inlet stage (411₁, ...), a central stage (414₁, ...), and an outlet stage (421₁, ...); characterized:

- in that Q and Q' are equal to R ,
- in that the central stage includes R^2 matrices,
- in that the inlet stage and the outlet stage each comprise $R.N$ switching matrices,

- in that the matrices of the inlet stage and the matrices of the central stage are organized into R sets (41₁, ...) each including N matrices of the inlet stage and R matrices of the central stage and the matrices of the outlet stage are organized into N sets (42₁, ..., 42 _{N}) of R matrices;

- in that each of the $R.N$ matrices (311₁, ...) of the inlet stage has a single input (412₁) and R outputs (413₁₁, ...),

- in that each of the R^2 matrices (414₁, ...) of the central stage has N inputs and N outputs, the N inputs being respectively connected to an output of each of the matrices (411₁, ..., 411 _{R}) of the inlet stage that belong to the same set of matrices; and

- in that each of the $R.N$ matrices of the outlet stage has R inputs (423₁) and a single output (422₁), those R inputs being connected to outputs respectively belonging to the R sets of matrices of the central stage and of the inlet stage.

5. A switching device according to claim 3 or ~~claim 4~~, characterized in that $N = 2R^2$.

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